

REMARKS/ARGUMENTS

Reconsideration and allowance of this application are respectfully requested in view of the above amendments and the following remarks.

Claims 3-30 and 32-58 are canceled without prejudice or disclaimer for possible filing in a divisional application. Claims 1, 2 and 31 remain in this application for further consideration. Claim 31 has been amended to remove an unnecessary limitation and to more distinctly claim one example embodiment of the invention.

In Figures 6, 8, 10A-10K, 14, 15, 16A and 16B, descriptive labels and headings and text were amended to correct typographical errors and to more clearly identify the Figures so as to correspond more closely with the written description set forth in the specification.

The rejection of claims 1, 2 and 31 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement is traversed. Applicants respectfully contend that the specification adequately describes the "logical direct and indirect coordinate data" as recited in the claims, in a manner that would readily enable one skilled in the art to make and/or use the invention. Applicants also contend that all subject matter set forth in the above claims is described in Applicants' specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, Applicants' specification at pages 21-31, clearly describes both the direct and the indirect texture coordinate modes in detail and provides logical examples, with reference to Figures 6, 7A and 7B, of both regular texture lookup and "indirect texture" lookup operations that occur as a result of processing a direct texture coordinate versus

processing an indirect texture coordinate. As disclosed in the above mentioned portions of applicants' specification, texture coordinates are set up (designated) as either "direct" or "indirect" by specific API functions (i.e., the Application Programming Interface command instructions), examples of which are discussed in the specification at pages 34-47 with reference to Figures 12 and 13. Applicants contend that one of ordinary skill in this art would be familiar with the operation of an API and the implementation of associated command functions in a graphics processing system of the type disclosed by applicants that renders and displays images using polygon vertex data and texture data.

The rejection of claims 1 and 2 under 35 U.S.C. § 102(a) as anticipated by the McCool et al. publication entitled "Texture Shaders," is respectfully traversed. The McCool et al. publication describes proposed extensions to the OpenGL API for supporting programmable texture coordinate generation and a proposed multi-texturing stack machine for blending (shading) pixels. The "stack machine" described by McCool et al. is only a conceptual implementation which is not intended to serve as an example of an actual implementation of multi-texturing hardware (see "Texture Shaders" by McCool et al. at Sec. 6.5). There is no disclosure or teaching of the generation or use of indirect texture coordinates or interleaving indirect and direct texture coordinates during the processing of texture coordinates for texture lookups. Instead, McCool et al. proposes an implementation of a single pass texture shader using a staggered-SIMD processor architecture (see the McCool et al. publication at pages 124-125, Figures 4 and 5). However, the proposed texture shader implementation disclosed by McCool et al. is not relevant to the processing of texture coordinate data as set forth in Applicants' claims. Texture *shading* and texture *coordinate* processing are not the same thing.

Texture coordinate processing for performing texture lookup operations is functionally different from performing texture shading or blending operations. The McCool et al. texture shader does not perform processing (e.g., arithmetic and logical operations) on texture *coordinates* for the purpose of deriving modified texture coordinates to be used in further texture lookups. The McCool et al. texture shader is a distinct hardware portion located *downstream* from the "Texture Lookup and Filter" hardware (see Figure 3 of the McCool et al. "Texture Shaders" article) and the McCool et al. article discloses nothing about the hardware used in the Texture Lookup and Filter.

In a conventional pipelined graphics processing architecture, texture coordinate generation typically takes place in a portion of the pipeline, such as a vertex transformation and lighting unit, which precedes the rasterization hardware and the texture shader hardware portions (see, for example, the block labeled "texture coordinate generation and lighting" in Figure 3 of the "Texture Shaders" article by McCool et al.). Moreover, in the graphics pipeline implementation described in Applicants' specification, texture coordinate generation is performed at least in part by portion (300C) of the transform and lighting unit 300 (Figure 5). (See also Applicants' specification at page 18.) Indirect or direct modes for texture coordinate generation are set by the particular API commands that are used to implement various lighting and texturing functions. (See Applicants' specification at pages 34-47 and Figures 12 and 13.)

Accordingly, applicants contend the McCool et al. article entitled "Texture Shaders" does not teach or disclose a texture coordinate processing unit that interleaves processing of logical direct and indirect coordinate data as set forth in

Applicants' claims. Consequently, McCool et al. article does not anticipate applicants' claims 1 or 2 because it does not disclose every element of the claimed invention. See Lewmar Marine, Inc. v. Barient, Inc., 3 U.S.P.Q. 2d 1766 (Fed. Cir. 1987).

The rejection of claim 31 under 35 U.S.C. § 103(a) as being unpatentable over McCool et al. in view of Duluk, Jr. et al. (U.S. Patent 6,597,363) is respectfully traversed for at least the same reasons as set forth above with respect to the rejection of claims 1 and 2. The McCool et al. publication is directed toward proposed API extensions and an example texture shader implementation in a graphics accelerator architecture (Figure 3). The McCool et al. texture shader is not used to perform arithmetic and logical operations on texture *coordinates* for the purpose of deriving modified texture coordinates that are used in further texture lookups as does the texture coordinate/data processing unit set forth in applicants' claim 31.

With respect to Duluk, Jr. et al., although the '363 patent discloses a graphics processor encompassing numerous substructures and specialized subsystems, there is no teaching or suggestion of a texture coordinate processing unit having a data feedback path from the texture data retrieval unit to the texture coordinate processing unit to retrieve data for further processing by the texture coordinate processing unit in response to the processing of indirect texture coordinates as set forth by Applicants' claim 31. Applicants respectfully contend that adding the Fragment block 11000, Texture block 1200 or Phong 14000 block of the Duluk, Jr. et al. ('363) patent to "modify the high-level shader metaprogramming of McCool et al.", as suggested in the official action at page 8, even if feasible, would not result in applicants' invention as set forth

any of applicants' claims. Neither the Fragment block 11000, the Texture block 1200, the Phong block 14000 nor the Pixel block 15000 of the '363 patent can perform interleaved processing of direct and indirect coordinates. Moreover, there is no suggestion or motivation to combine these references since neither McCool et al. nor Duluk, Jr. et al., considered either together or alone, teach or suggest the use of a texture coordinate/data processing unit wherein the processing of regular texture coordinates is interleaved with processing of indirect texture coordinates and which is responsive to indirect texture coordinates to retrieve texture lookup data for use in deriving modified texture coordinates in the manner set forth in Applicants' claim 31.

When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. See In re Geiger, 815 F. 2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987).

Moreover, no references have been cited that provide a factual basis for the conclusion of what is alleged in the Office Action as being obvious, i.e., no teaching has been provided that suggests the obviousness of modifying the graphics accelerator architecture (Figure 3) of McCool et al. with the Fragment block 11000 or the Texture block 1200 or the Phong block 14000 nor the Pixel block of Duluk, Jr. et al. ('363) to perform interleaved processing of direct and indirect texture coordinates as claimed. Thus, the Office Action sets forth a conclusion of obviousness, not a reason supporting the alleged obviousness of the present invention. It is axiomatic that the PTO has a burden under §103 to establish a prima facie case of obviousness. See In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). Consequently, Applicants respectfully submit that not only would it have been unobvious to one of

ordinary skill in the art but that it would also be logically impossible to use any of the pipeline processing blocks disclosed by Duluk, Jr. et al. ('363) to modify the graphic accelerator architecture of McCool et al. to produce a graphics system as set forth in Applicants' claim 31.

Request for Interview with the Examiner -

If the Examiner has any further questions or concerns pertaining to the patentability of applicant's method and apparatus for interleaved processing of direct and indirect texture coordinate processing in a graphics system as set forth in the claims or as disclosed in the specification, he is respectfully requested to contact the undersigned at the telephone number listed below to set up a time and date for the purpose of allowing the undersigned to conduct an interview in person with the Examiner.

Applicants respectfully submit that the application and claims are in condition for allowance. Favorable consideration and prompt allowance are respectfully solicited. If there are any other issues remaining which the Examiner believes could be resolved through either a supplemental response or an Examiner's amendment, the Examiner is respectfully requested to contact the undersigned using the local telephone exchange number indicated below.

LEATHER et al.
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Respectfully submitted,

NIXON & VANDERHYE P.C.

By:

A handwritten signature in black ink, appearing to read "William G. Niessen", written over a horizontal line.

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